

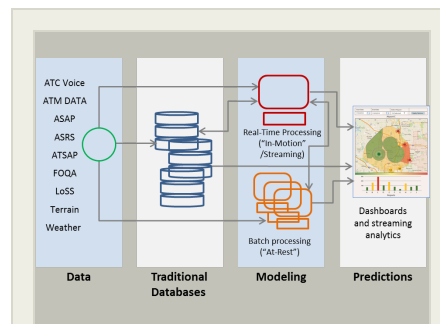
Big Data Driven Architecture for Real Time Systemwide Safety Assurance, Phase I

Completed Technology Project (2015 - 2015)



Project Introduction

NASA has the aim of researching aviation Real-time System-wide Safety Assurance (RSSA) with a focus on the development of prognostic decision support tools as one of its new aeronautics research pillars. The vision of RSSA is to accelerate the discovery of previously unknown safety threats in real time and enable rapid mitigation of safety risks through analysis of massive amounts of aviation data. Our innovation supports this vision by designing a hybrid architecture combining traditional database technology and real-time streaming analytics in a Big Data environment. The innovation includes three major components: a Batch Processing framework, Traditional Databases and Streaming Analytics. It addresses at least three major needs within the aviation safety community. First, the innovation supports the creation of future data-driven safety prognostic decision support tools that must pull data from heterogeneous data sources and seamlessly combine them to be effective for NAS stakeholders. Second, our innovation opens up the possibility to provide real-time NAS performance analytics desired by key aviation stakeholders. Third, our proposed architecture provides a mechanism for safety risk accuracy evaluations. To accomplish this innovation, we have three technical objectives and related work plan efforts. The first objective is the determination of the system and functional requirements. We identify the system and functional requirements from aviation safety stakeholders for a set of use cases by investigating how they would use the system and what data processing functions they need to support their decisions. The second objective is to create a Big Data technology-driven architecture. Here we explore and identify the best technologies for the components in the system including Big Data processing and architectural techniques adapted for aviation data applications. Finally, our third objective is the development and demonstration of a proof-of-concept.



Big Data Driven Architecture for Real Time Systemwide Safety Assurance, Phase I

Table of Contents

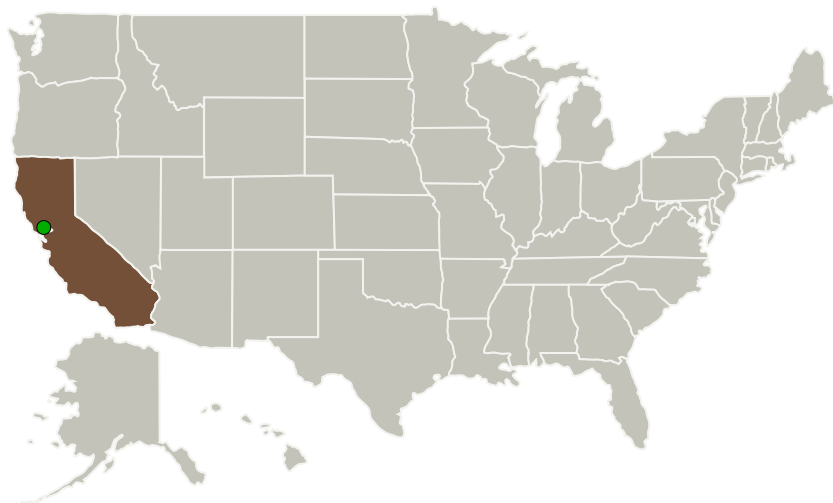
Project Introduction	1
Primary U.S. Work Locations and Key Partners	2
Project Transitions	2
Organizational Responsibility	2
Project Management	2
Technology Maturity (TRL)	2
Images	3
Technology Areas	3
Target Destinations	3

Big Data Driven Architecture for Real Time Systemwide Safety Assurance, Phase I

Completed Technology Project (2015 - 2015)



Primary U.S. Work Locations and Key Partners



Organizations Performing Work	Role	Type	Location
ATAC	Lead Organization	Industry	Santa Clara, California
● Ames Research Center(ARC)	Supporting Organization	NASA Center	Moffett Field, California

Primary U.S. Work Locations

California

Project Transitions

**June 2015:** Project Start**December 2015:** Closed out

Closeout Summary: Big Data Driven Architecture for Real Time Systemwide Safety Assurance, Phase I Project Image

Closeout Documentation:

- Final Summary Chart Image(<https://techport.nasa.gov/file/138845>)

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

ATAC

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

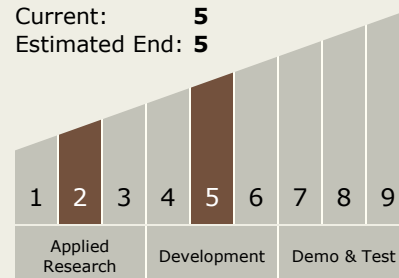
Carlos Torrez

Principal Investigator:

John E Schade

Technology Maturity (TRL)

Start: 2
Current: 5
Estimated End: 5

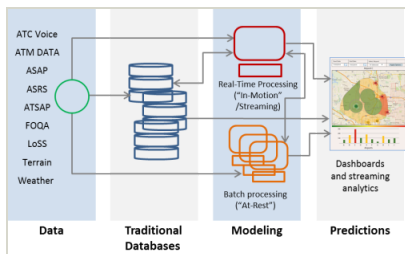


Big Data Driven Architecture for Real Time Systemwide Safety Assurance, Phase I

Completed Technology Project (2015 - 2015)



Images



Briefing Chart Image

Big Data Driven Architecture for
Real Time Systemwide Safety
Assurance, Phase I

(<https://techport.nasa.gov/image/132837>)

Technology Areas

Primary:

- TX01 Propulsion Systems
 - └ TX01.3 Aero Propulsion
 - └ TX01.3.1 Integrated Systems and Ancillary Technologies

Target Destinations

The Sun, Earth, The Moon,
Mars, Others Inside the Solar
System, Outside the Solar
System